Selected Definitions on Heliport

Declared distances — heliports.

a) *Take-off distance available (TODAH).* The length of the FATO plus the length of helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off.

b) *Rejected take-off distance available (RTODAH).* The length of the FATO declared available and suitable for helicopters operated in performance class 1 to complete a rejected take-off.

c) *Landing distance available (LDAH).* The length of the FATO plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.

Elevated heliport. A heliport located on a raised structure on land.

Final approach and take-off area (FATO). A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by helicopters operated in performance class 1, the defined area includes the rejected take-off area available.

Helicopter air taxiway. A defined path on the surface established for the air taxiing of helicopters.

Helicopter clearway. A defined area on the ground or water, selected and/or prepared as a suitable area over which a helicopter operated in performance class 1 may accelerate and achieve a specific height.

Helicopter ground taxiway. A ground taxiway intended for the ground movement of wheeled undercarriage helicopters.

Helicopter stand. An aircraft stand which provides for parking a helicopter and where ground taxi operations are completed or where the helicopter touches down and lifts off for air taxi operations.

Helicopter taxi-route. A defined path established for the movement of helicopters from one part of a heliport to another. A taxi-route includes a helicopter air or ground taxiway which is centred on the taxi-route.

Helideck. A heliport located on a fixed or floating offshore facility such as an exploration and/or production unit used for the exploitation of oil or gas.

Heliport. An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

Heliport elevation. The elevation of the highest point of the FATO.

Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

a) are located on an area intended for the surface movement of aircraft; or

b) extend above a defined surface intended to protect aircraft in flight; or

c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

Orthometric height. Height of a point related to the geoid, generally presented as an MSL elevation.

Point-in-space approach (PinS). The Point-in-space approach is based on GNSS and is an approach procedure designed for helicopter only. It is aligned with a reference point located to permit subsequent flight manoeuvring or approach and landing using visual manoeuvring in adequate visual conditions to see and avoid obstacles.

Point-in-space (PinS) visual segment. This is the segment of a helicopter PinS approach procedure from the MAPt to the landing location for a PinS "proceed visually" procedure. This visual segment connects the Point-in-space (PinS) to the landing location.

Protection area. An area within a taxi-route and around a helicopter stand which provides separation from objects, the FATO, other taxi-routes and helicopter stands, for safe manoeuvring of helicopters.

Rejected take-off area. A defined area on a heliport suitable for helicopters operating in performance class 1 to complete a rejected take-off.

Runway-type FATO. A FATO having characteristics similar in shape to a runway.

Safety area. A defined area on a heliport surrounding the FATO which is free of obstacles, other than those required for air navigation purposes, and intended to reduce the risk of damage to helicopters accidentally diverging from the FATO.

Shipboard heliport. A heliport located on a ship that may be purpose or non-purpose-built. A purpose-built shipboard heliport is one designed specifically for helicopter operations. A non-purpose-built shipboard heliport is one that utilizes an area of the ship that is capable of supporting a helicopter but not designed specifically for that task.

Surface-level heliport. A heliport located on the ground or on a structure on the surface of the water.

Touchdown and lift-off area (TLOF). An area on which a helicopter may touch down or lift off.

CHAPTER 3. PHYSICAL CHARACTERISTICS

3.1 Surface-level heliports

Touchdown and lift-off areas

Final approach and take-off areas

Safety areas

Helicopter clearways

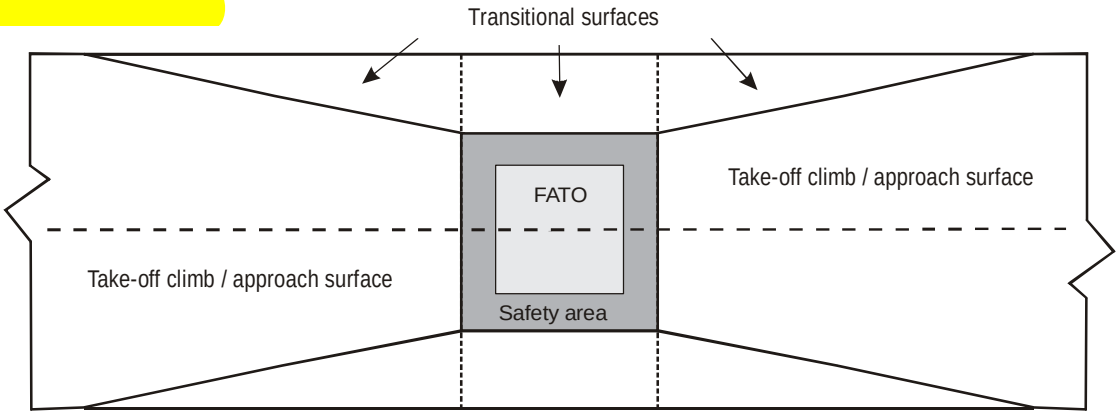
Helicopter ground taxiways and helicopter ground taxi-routes

4.1 Obstacle limitation surfaces and sectors

Approach surface

Transitional surface

Take-off climb surface



Note 1.— For single take-off climb / approach surface. Transition surface extends perpendicular to far side of Safety Area.
Note 2.— PANS-OPS, Doc 8168, Volume II, Part IV Helicopters, details procedure design criteria.
Note 3.— This figure shows a square FATO for illustration purposes only. For a circular FATO the transitional surface lower and upper edges would also be circular.

Figure 4-3. Transitional surface for a FATO with a PinS approach procedure with a VSS

Table 4-1. Dimensions and slopes of obstacle limitation surfaces for all visual FATOs

SURFACE and DIMENSIONS	*SLOPE DESIGN CATEGORIES*		
	A	B	C
APPROACH and TAKE-OFF CLIMB SURFACE:			
Length of inner edge	Width of safety area	Width of safety area	Width of safety area
Location of inner edge	Safety area boundary (Clearway boundary if provided)	Safety area boundary	Safety area boundary
Divergence: (1st and 2nd section)			
Day use only	10%	10%	10%
Night use	15%	15%	15%
First Section:			
Length	3 386 m	245 m	1 220 m
Slope	4.5% (1:22.2)	8% (1:12.5)	12.5% (1:8)
Outer Width	(b)	N/A	(b)
Second Section:			
Length	N/A	830 m	N/A
Slope	N/A	16% (1:6.25)	N/A
Outer Width	N/A	(b)	N/A
Total Length from inner edge (a)	3 386 m	1 075 m	1 220 m
Transitional Surface: (FATOs with a PinS approach procedure with a VSS)			
Slope	50% (1:2)	50% (1:2)	50% (1:2)
Height	45 m	45 m	45 m

(a) The approach and take-off climb surface lengths of 3 386 m, 1 075 m and 1 220 m associated with the respective slopes, brings the helicopter to 152 m (500 ft) above FATO elevation.

(b) Seven rotor diameters overall width for day operations or 10 rotor diameters overall width for night operations.

Note.— The slope design categories in Table 4-1 may not be restricted to a specific performance class of operation and may be applicable to more than one performance class of operation. The slope design categories depicted in Table 4-1 represent minimum design slope angles and not operational slopes. Slope category "A" generally corresponds with helicopters operated in performance class 1; slope category "B" generally corresponds with helicopters operated in performance class 3; and slope category "C" generally corresponds with helicopters operated in performance class 2. Consultation with helicopter operators will help to determine the appropriate slope category to apply according to the heliport environment and the most critical helicopter type for which the heliport is intended.

५. Obstacle Limitation Requirements for Surface Level Heliports:

५.१ हेलिप्याड निर्माणस्थल सम्भव भए सम्म चारै दिशाबाट खुल्ला हुनु पर्नेछ ।

५.२ हेलिकप्टर उडान अवतरण गर्नको लागि बाधा पुऱ्याउने किसिमको अवरोधहरु हुनु हुंदैन।

५.३ हेलिकप्टर हेलिप्याडमा उडान अवतरण गर्ने बाटोमा कुनै किसिमको संरचना, रुखहरु तथा अन्य पहाड हुनु हुदैन। हेलिप्याड कम्तीमा दुई दिशाबाट खुल्ला हुनुपर्नेछ।

५.४ हेलिकप्टरको उडान अवतरणमा हावाको वेग निकै धेरै हुने भएकोले सो को वरिपरी हावाले उडाउन सक्ने किसिमको कुनै पनि संरचना वा सामाग्री हुनु हुंदैन।

५.५ हेलिप्याडको Obstacle Limitation Surface संग सम्बन्धित विस्तृत जानकारी ICAO Annex 14, Vol II मा उल्लेख गरिए बमोजिम हुनेछ।

६. Pavement:

६.१ हेलिप्याडको सतह सामान्यतया PCC ले बनेको हुनु पर्नेछ।

६.२ Federal Aviation Authority (FAA) को Standard Pavement Design गर्ने तरिकाले डिजाइन गर्दा सामान्यतया FATOमा MI-17 हेलिकप्टरको pavement thickness १५ से.मी मोटाई र PCC को तलको base layer कम्तिमा २० से.मि हुनुपर्दछ।

६.३ ठांउको दुर्गमता र बजेटलाई मध्यनजर गर्दा कतिपय ठांउमा सिमेन्ट बालुवा उपलब्ध नभएको स्थितिमा, ३० से.मि. ढुङ्गाको सोलिङ्ग गरेर ढुङ्गाको विचको भागको छिद्रहरुमा माटोमा पानीले भिजाई धुर्मुसको मद्दतले खंदिलो बनाउन सकिन्छ।

६.४ यसरी बनाइएको हेलिप्याड समथर हुनुपर्छ र समय समयमा स्थानिय तहबाट मर्मत सम्भार गरीराख्नु पर्दछ।

६.५ धेरै धुलो उड्ने ठांउमा हेलिकप्टर उडान अवतरण गर्नु पूर्व पानी छम्किएर धुलो नियन्त्रण गर्नु सकिन्छ।

६.६ Safety area को हकमा समेत २० से.मी. स्टोन सोलिङ्ग अथवा ग्रावेल बिछ्याउनु पर्दछ। सतहको स्लोप अनुसूची-२ को तस्विरमा उल्लेख भए बमोजिम हुनुपर्नेछ।

७. हेलिप्याड मार्किङ्गः

७.१ हेलिप्याडको TLOF (Touch-down and Lift-off) को माझमा पर्ने गरी "H" आकारको सेतो मार्किङ्ग गर्नु पर्नेछ।

७.२ मार्किङ्गको नाप अनुसूचीमा रहेको तस्विरमा उल्लेख भए बमोजिम हुनेछ। हेलिकप्टरको अवतरण हुने दिशातिर "H" को माथिल्लो भाग फर्केको हुनु पर्दछ।

७.३ TLOF क्षेत्रको बाहिरी परिधि (Perimeter) मा ३० से.मी. चौडाईको सेतो TLOF मार्किङ्ग बनाउनु पर्नेछ।

७.४ हेलिप्याड मार्किङ्ग सम्वन्धि अन्य कुरा अनुसूची -३ मा उल्लेख गरिएको छ ।-

८. Wind Direction Indicator:

८.१ हेलिप्याडमा अनुसूची-४ को चित्रमा उल्लेख गरिए बमोजिम हावा बहने दिशा देखाउने किसिमको रातो र सेतो सोली आकारको २.४ मिटर लम्वाई र ०.६ मिटर (ठूलो भागमा) ०.३ मिटर (सानो भागमा) को व्यासको Wind Direction Indicator (Wind Sock) हुनु पर्दछ ।

८.२ **Wind Sock** हेलिप्याड क्षेत्रमा बहेको हावाको सहि मापन हुने गरि र कतैबाट हावाको बहाव नछेकिने गरि राख्नु पर्दछ।

८.३ **Wind Sock** चारै दिशामा सजिलै संग घुम्न सक्ने किसिमको हुनु पर्दछ।

९. हेलिप्याड डिजाईन गर्ने तरिकाः

९.१ हेलिप्याड निर्माण गर्नको लागि डिजाइन हेलिकप्टर छानी अनुसूची ६ मा रहेको विवरण बमोजिम हेलिप्याड निर्माण गर्ने नाप हिसाब गरेर निकाल्नु पर्दछ ।

९.२ अनुसूची ६ मा उल्लेखित हेलिकप्टरहरु नेपालमा सन्चालनमा रहेका हेलिकप्टर मध्ये एक ठुलो र एक सानो किसिमका रहेकाले स्थानिय निकायले आफ्नो आवश्यकता अनुसार डिजाइन हेलिकप्टर छनोट गरि सोही अनुसूचीमा उल्लेखित विवरण बमोजिम डिजाईन अगाडि बढाउन सक्नेछन्।

१०. हेलिप्याडको डिजाईन गर्दा नाप निकाल्ने तरिकाः

१०.१ Touchdown and Lift-off area (TLOF):

१०.१.१ Touchdown and Lift-off area (TLOF) को आकार कम्तिमा ०.८३* D (डिजाइन हेलिकप्टरको रोटर व्लेड सहितको सबै भन्दा ठुलो लम्वाई) हुनु पर्नेछ।

१०.१.२ Touchdown and Lift-off area (TLOF) को आकार गोलो अथवा चतुर्भुज हुन सक्नेछ। MI 17 हेलिकप्टरको लागि TLOF को आकार २५.३१*०.८३ = २१ मिटर हुन आउछ।

१०.२ Final Approach and Take off Area (FATO):

१०.२.१ Final Approach and Take off Area (FATO) को आकार डिजाईन हेलिकप्टरको Maximum Take-off Mass अनुसार निकालिन्छ।

१०.२.२ डिजाइन हेलिकप्टरको maximum take-off mass (MTOM) ३,१७५ केजी भन्दा बढी छ भने, (FATO) कम्तिमा १*D (डिजाइन हेलिकप्टरको रोटर ब्लेड सहितको सबै भन्दा ठुलो लम्बाई) आकारको हुनु पर्नेछ अन्यथा ०.८३* D (डिजाइन हेलिकप्टरको रोटर ब्लेड सहितको सबै भन्दा ठुलो लम्बाई) आकारको गोलो अथवा चतुर्भुज Final Approach and Take of Area (FATO) बनाउन सकिनेछ।

१०.२.३ MI 17 हेलिकप्टरको लागि FATO को आकार २५.३१*१ =२५.३१~२६ मिटर हुन आउछ। २६ मिटर व्यासको गोलो अथवा २६*२६ मिटरको चतुर्भुज आकारको FATO निर्माण गर्न सकिनेछ।

१०.३ Safety Area:

१०.३.१ कुनै पनि हेलिप्याडमा Safety Area अपरिहार्य हुन्छ। Safety area को भित्र FATO र FATO को भित्र TLOF क्षेत्रहरु पर्न आउछ। Visual Meteorological Conditions (VMC) उडानको लागि Safety area FATO को बाहिरी किनाराबाट कम्तीमा ३ मिटर अथवा ०.२५*D (दुईवटा मध्ये जुन चाही बढि हुन्छ) हुनु पर्नेछ।

१०.३.२ Safety area को चौडाई कम्तीमा २*D गोलाकारको व्यास अथवा सो अटाउने चतुर्भुजको हुनु पर्नेछ।

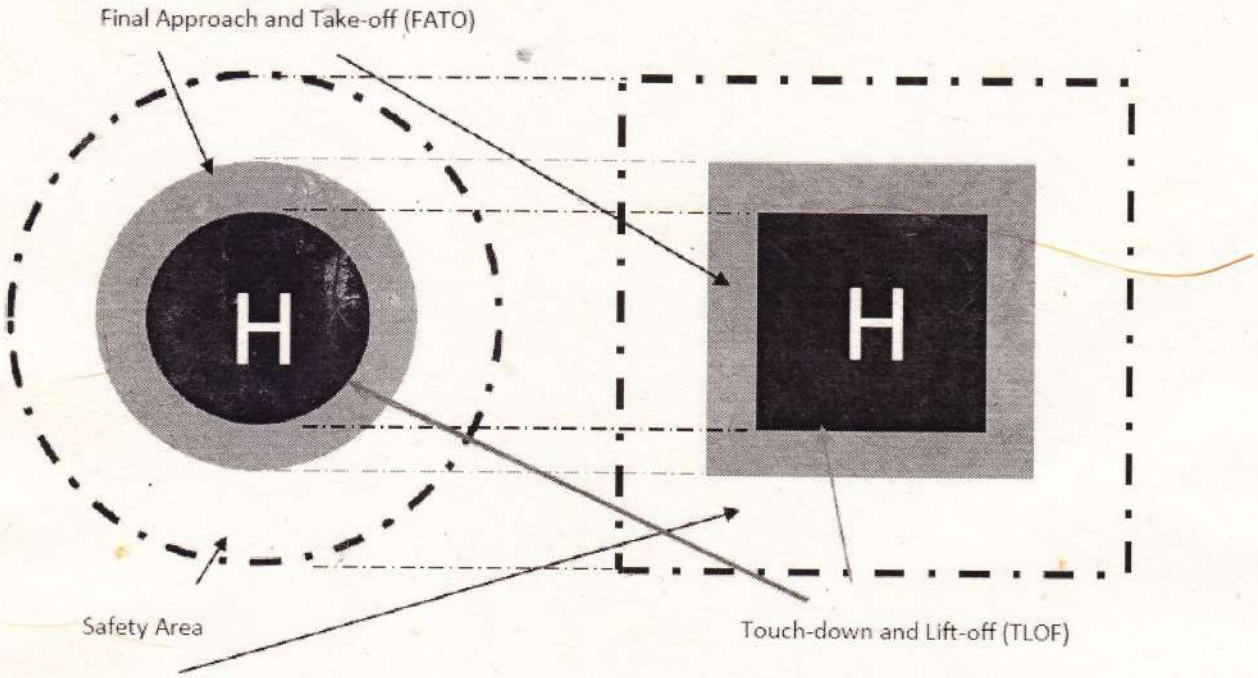
१०.३.३ MI 17 हेलिकप्टरको लागि safety area को आकार २५.३१*२ =५०.६२ ~ ५१ मिटर हुन आउछ। ५१ मिटर व्यासको गोलो अथवा ५१*५१ मिटरको चतुर्भुज आकारको Safety Area निर्माण गर्न सकिनेछ।

(हेलिप्याडको डिजाईन गर्दा नाप निकाल्ने नमूना अनुसूची ५ र अनुसूची ६ मा उल्लेख गरिएकोछ ।)

अनूसुची - १

(दफा ४ संग सम्बन्धित)

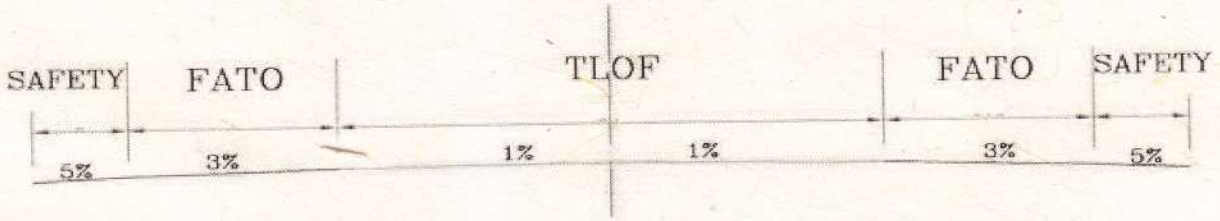
Circular and Square Helipad

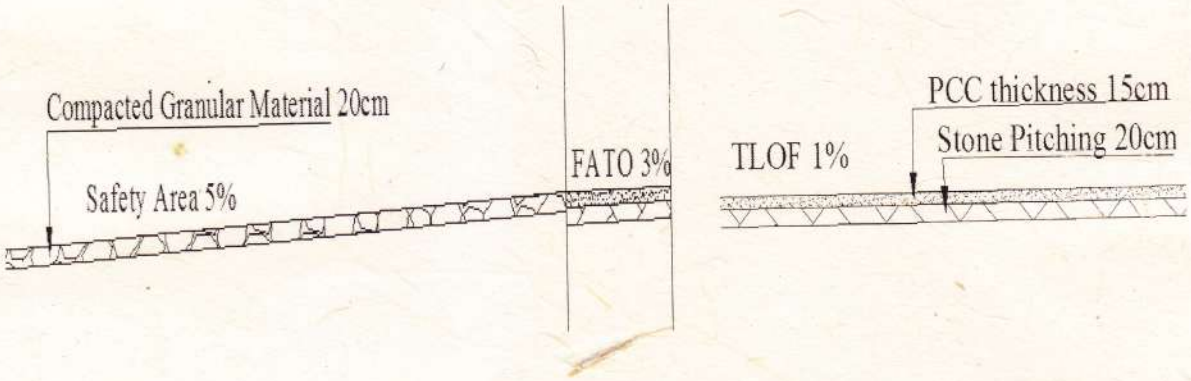


अनूसुची - २

(दफा ६ संग सम्बन्धित)

हेलिप्याडको सतह PCC सम्वन्धी मापदण्ड





Generally, helipad are constructed with a PCC surface. The pavement is designed considering a dynamic load equal to 150 percent of the gross helicopter weight, equally distributed between the main landing gears. For the majority of helicopters, which have a maximum gross weight less than 30,000 pounds (13 610 kg), a 6-inch (150 mm) PCC slab will generally be sufficient. However, the loads of fuel or maintenance vehicles may be more demanding than the helicopter loads and may require additional pavement thickness.

Since maximum gross weight of MI17 (Design Helicopter) is 13000Kg, which is less than 13610kg so PCC slab of thickness of 150 mm should be provided over stone soling of thickness 200mm on the portion of FATO. Compacted granular material of thickness 200mm should be provided on Safety Area.

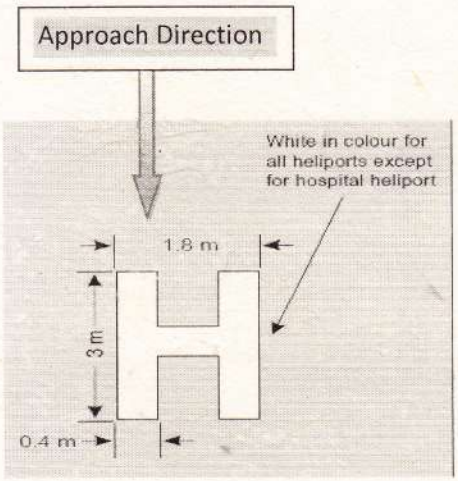
अनूसुची – ३

(दफा ७ संग सम्बन्धित)

हेलिप्याडको मार्किङ्ग सम्बन्धी मापदण्ड

A. Helipad Identification Marking:

- Letter H, white color, dimension shall not be less than marking showing in Figure below.
- On a FATO which contains a TLOF, a heliport identification marking shall be located in the FATO so the position of it coincides with the centre of the TLOF
- A helipad identification marking shall be oriented with the cross arm of the H at right angles to the preferred final approach direction.



B. Touchdown and lift-off area perimeter marking

- A TLOF perimeter marking shall be displayed on a TLOF located in a FATO at a surface-level heliport if the perimeter of the TLOF is not self-evident
- The TLOF perimeter marking shall be located along the edge of the TLOF.
- A TLOF perimeter marking shall consist of a continuous white line with a width of at least 30 cm.

अनूसुची - ५

(दफा ९ संग सम्बन्धित)

हेलिप्याडको डिजाईन सम्वन्धी मापदण्ड

Touchdown and Lift-off area (TLOF): The TLOF shall be of sufficient size to contain a circle of diameter of at least 0.83 D of the largest helicopter the area is intended to serve.

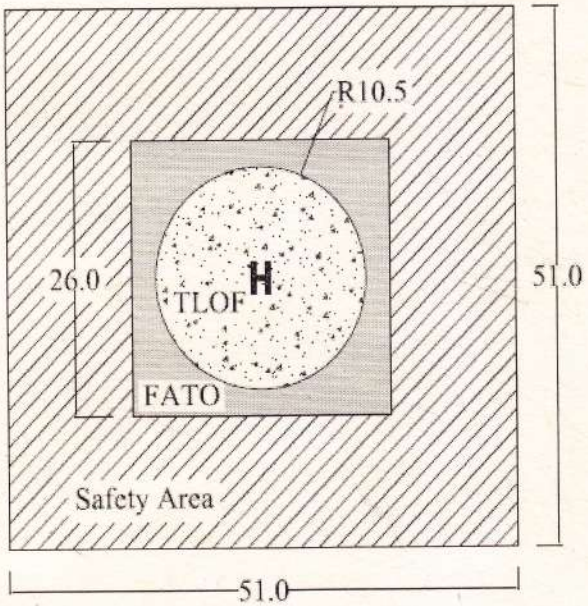
For MI 17 Helicopter, the TLOF size is a circle of Diameter 21m (0.83*25.31).

Final Approach and Take of Area (FATO): The dimensions of a FATO shall be not less than 1 D of the largest helicopter when the maximum take-off mass (MTOM) of helicopters the FATO is intended to serve is more than 3,175 kg and

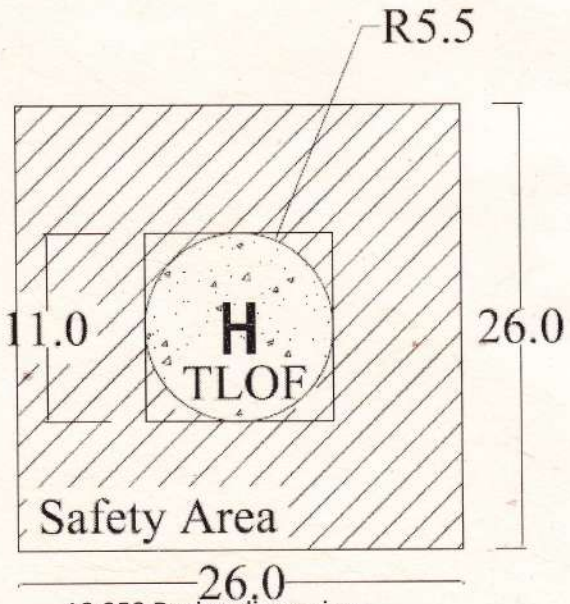
0.83 D of the largest helicopter when the MTOM of helicopters the FATO is intended to serve is 3 175 kg or less.

For MI 17 Helicopter, size of FATO is 25.31 m*25.31 m. For the design and construction the size is taken as **26m*26m**.

Safety Area: For Visual Meteorological Conditions (VMC), the safety area surrounding FATO shall extend outwards from the periphery, at least 3m or 0.25 times overall length/width whichever is greater and each external side of the safety area shall be at least 2 D where the FATO is quadrilateral; for the longest/widest helicopter the area is intended to serve (ICAO).
As, the FATO is quadrilateral the external side of the safety area should be 51m. As 26m FATO is provided, hence, 12.5 m wide safety area is provided from the periphery of FATO.



MI-17 Design Dimensions



AS-350 Design dimensions

अनूसुची - ६

(दफा ९ र १० संग सम्बन्धित)

हेलिप्याडको डिजाईन र नाप सम्वन्धी नमूना

MI 17

Maximum Take-off Mass (MTOM)	: 13000kg
Largest overall Dimension (D)	: 25.31m
Overall Height	: 5.54m
Main Rotor Diameter	: 21.29m

AS-350

Maximum Take-off Mass (MTOM)	: 2370 kg
Largest overall Dimension (D)	: 12.94 m
Overall Height	: 3.14 m
Main Rotor Diameter	: 10.69 m